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**January 7, 2002**

Mr. Raymond J. McCormick  
Office of Bridge Technology, HIBT-30  
Federal Highway Administration  
400 Seventh Street, SW  
Washington, DC 20590-0001

RE: Advanced Notice of Proposed  
Rulemaking for the Highway Bridge  
Replacement and Rehabilitation  
Program (HBRRP) and the National  
Bridge Inspection Standards (NBIS)

Dear Mr. McCormick:

The September 26, 2001 Edition of the Federal Register announced that the Federal Highway Administration (FHWA) is seeking comments concerning revisions to the HBRRP and NBIS. Our local FHWA Bridge Engineer is new and did not inform me in time to submit my comments before your regular deadline. However, he discussed the matter with Tom Everett and told me that, if I submit my comments promptly, they can still be accepted and reviewed. Therefore, I have the following comments. I will divide my comments into HBRRP and NBIS sections.

**Highway Bridge Replacement and Rehabilitation Program (HBRRP)**

As the Manager of the Tennessee Headquarters Bridge Inspection Office, I am more familiar with the National Bridge Inspection Standards (NBIS) than the HBRRP. Nevertheless, I can offer a few comments. These comments are tied to the questions raised by the FHWA and organized by the American Road & Transportation Builders Association (ARTBA) in their memorandum dated November 1, 2001.

1. A bridge is eligible for HBRRP funding if it is undergoing "major reconstruction" as defined under Sec. 650.405. Is the current definition for "major reconstruction" adequate?

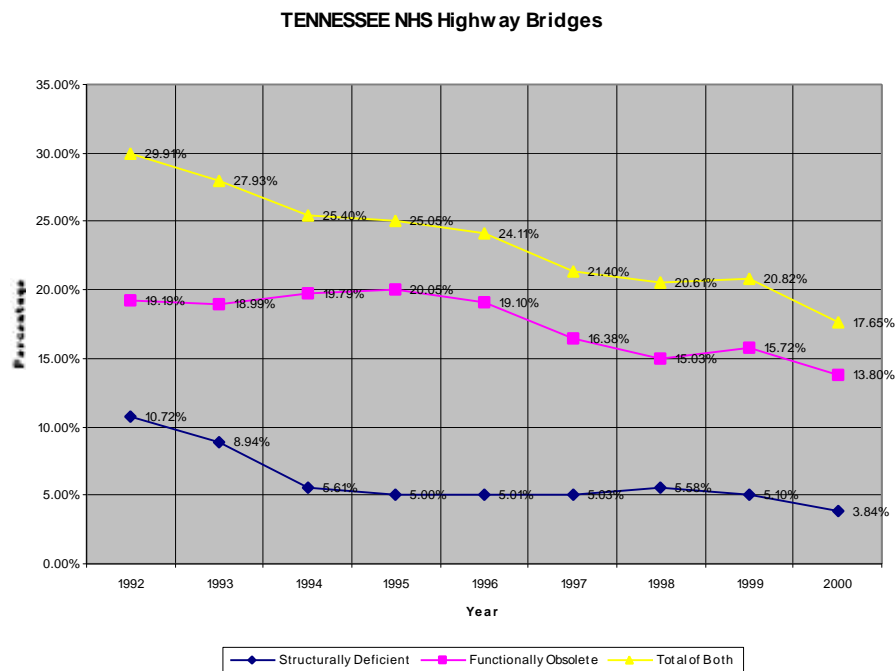
Ans. I believe the current definition is adequate. I have no suggested improvements.

2. Preventive maintenance is considered by the National Highway System Designation Act of 1995 as an activity that is eligible for federal assistance if the State demonstrates that the activity is a cost effective means of extending the useful life of a federal-aid highway. Should the definition of what constitutes rehabilitation be expanded?

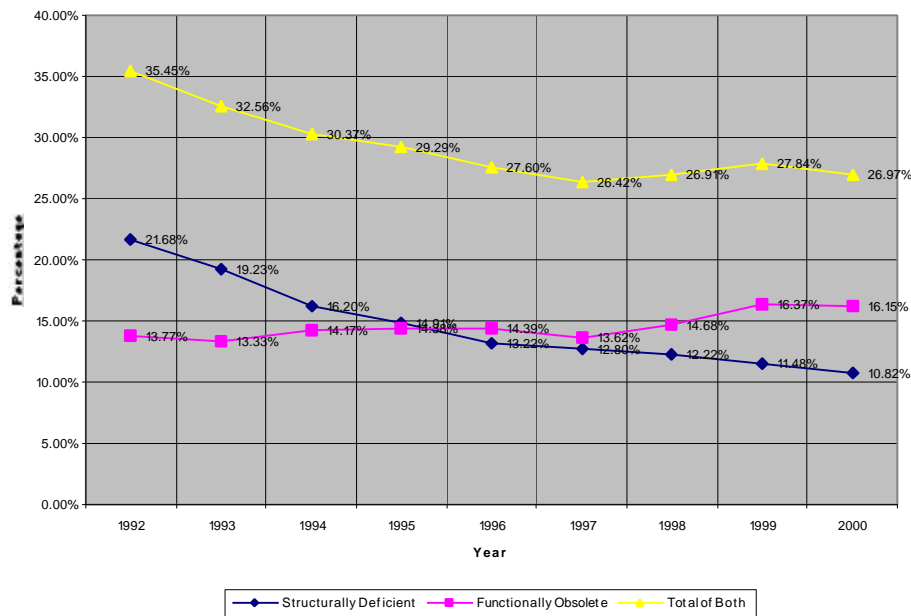
Ans. Bridge maintenance activities are extremely diverse. I think that it would be almost impossible to develop a concise definition that would include both rehabilitation and the entire universe of possible maintenance actions. Any kind of specific listing of approved actions will necessarily be limited and incomplete. I would favor a general definition that simply approves any action that extends the useful life of the bridge.

3. The HBRRP is intended to provide funds for upgrading the Nation's bridges to provide for increasingly safe structures for the traveling public. What flexibility should be provided in this program in order to reach this goal?

Ans. The current guidelines seem to be working for Tennessee. Under these procedures, we have been able to reduce the numbers of Structurally Deficient and Functionally Obsolete bridges for both National Highway System (NHS) and Non-NHS structures. See the attached graphs that are based upon our NBI data submittals and are published, by the FHWA, at <http://www.fhwa.dot.gov/bridge/brdefic.htm>.



### TENNESSEE NON-NHS Highway Bridges



Except for a slight increase in Functionally Obsolete Non-NHS bridges, Tennessee has shown steady progress during the period of 1992 to 2000.

My only suggestion would be that, if the FHWA wants to pay for maintenance activities with HBRP funding, then they should include a block grant of funds earmarked for bridge maintenance. The State should be given the flexibility to either use these funds for maintenance or continue to use them for traditional rehabilitation under the current guidelines. As pointed out above, the diversity of possible maintenance actions is such that “micro-management” of such expenditures should be avoided by the FHWA.

4. The standards that govern eligibility for rehabilitation and replacement are the AASHTO or the State’ standards depending on the classification of the highway system. Should there be consistency nationwide on the appropriate standards(s) to be followed on all bridges that are insensitive to highway classification?

Ans. I find this question rather odd. How can a bridge be “insensitive” to highway classification? The FHWA needs to further define this question. Furthermore, why duplicate or supercede the standards already established by AASHTO? Given the diverse nature of climate and terrain found across the United States, I find it doubtful that standards set by the FHWA in Washington D.C. would prove adequate. I think that the States are in the best position to gauge appropriate standards for their area and, as a practical matter, most adhere to the AASHTO standards as much as possible.

5. Certain actions, such as paving project overlays, utility work, emergency repairs, retrofitting to correct a limited deficiency, work to keep the bridge open while the replacement structure is being built, etc., are not eligible for HBRRP funds. Should the definition of a major reconstruction project include some or all of these types of projects? Should these types of projects be eligible for HBRRP funds?

Ans. I do not feel that these types of projects need to be included in the definition of major reconstruction. If it is desirable to make them eligible for HBRRP funding, then it should be done under a block grant. See the response to #3 above.

6. The FHWA uses the sufficiency rating as a basis for establishing eligibility and priority for HBRRP funding. Through this process a list of eligible bridges is established. The States then may choose any bridge project on this list for replacement or rehabilitation. Should this process be changed?

Ans. The sufficiency rating method has evolved over several decades and, in my opinion, is functioning adequately. Changes to the formula for calculating the sufficiency rating, which I understand the FHWA is currently considering, should be undertaken with extreme caution since it may have major or severe bridge funding impacts. Therefore, my first impulse is to oppose radical changes to the current method.

My main problem with the current method is the artificial limits used today. For example, a bridge must score a sufficiency rating below 50 to qualify for replacement. There is little rational justification for picking such an arbitrary number. As Tennessee has increasingly reduced its numbers of Structurally Deficient bridges, it has started to address bridges that are Functionally Obsolete. In many cases replacement, rather than rehabilitation, is the best option for some of these bridges. Yet, because these bridges score above 50, we must expend considerable effort to justify replacement to the FHWA. My suggestion would be to drop the "below 50" requirement. The FHWA should simply issue a Selection List of acceptable bridges and then leave it to the State to decide if replacement or rehabilitation is the best option for any bridge on the list.

7. The apportionment factors are based on bridge construction unit costs sent annually by the States to the FHWA. The FHWA uses 3-year averages of these costs as replacement costs. The FHWA is seeking comments on this process and on improving the accuracy of the cost data received.

Ans. Our Design Office handles this cost information so they are in a better position to offer improvement suggestions than I. Eventually, we may be able to track costs with the PONTIS bridge management software to the point where submittal of PONTIS cost data may be more accurate. However, the quality of our current PONTIS data is not at that stage yet.

8. Section 650.411 sets procedures for bridge replacement and rehabilitation projects for submission and approval. Should any of this be modified?

Ans. Once again, I feel that I am in a poor position to comment on these procedures since my office is not heavily involved in the submission process.

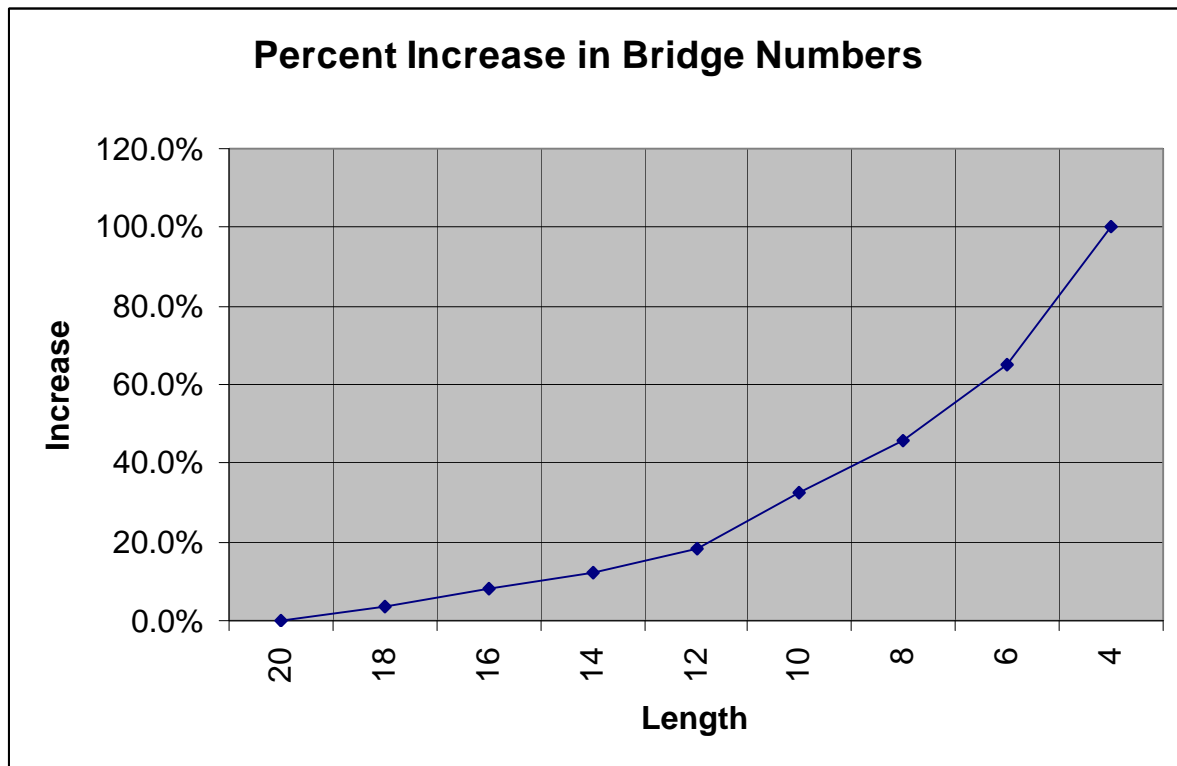
### **National Bridge Inspection Standards (NBIS)**

My office is intimately involved with keeping the State of Tennessee in compliance with the NBI Standards. Therefore, I do have a number of comments to make regarding proposed changes.

1. FHWA regulations require that the AASHTO definition of a bridge be used when determining which structures are to be inspected and reported. Current AASHTO policy measures bridges from undercopings of the abutments or spring lines of arches, or between extreme ends of openings for multiple boxes. These measurements must be equal to or greater than 20 feet (6.1 meters) for the structure to qualify as a bridge. Should the FHWA develop its own definition of a bridge for the purpose of inspection and reporting? Should the FHWA definition change the way the bridge length is determined or what the minimum bridge length should be for reporting purposes?

Ans. Given the diverse types of bridge designs in use, it is difficult to see how the FHWA could develop a definition that is different or better than the current definition. I am generally comfortable with the current procedure used to measure the NBIS length of a bridge.

Furthermore, any change in the qualification length could add greatly to the number of bridges that need to be inspected. It so happens that Tennessee does conduct, on a 4-Year cycle, inspections of structures that are less than 20 feet in length and that are on State maintained routes. Therefore, we can quantify the extent to which reducing the acceptable length would increase the number of qualifying structures. For example, if we dropped the limit from 20 feet down to 10 feet, we would see an increase of about 1/3 more bridges. Going down to 6 feet would increase the number by 2/3. If these proportions hold for other States, then this would give a staggering increase in the numbers of bridges requiring inspection. Currently, there are approximately 600,000 structures, nationwide, that qualify as a "Bridge" under the 20-foot limit. Going down to a 10-foot limit would add roughly 200,000 more structures to this total. This is a significant increase in workload that should not be undertaken unless the Federal Government is willing to allocate additional funding to support the effort. See the chart given below. Note that this data was derived using only Tennessee State maintained structures and routes.



The TDOT bridge inspection staff, especially the staff in the Headquarters office, is already strained to the breaking point. A significant increase in workload simply could not be sustained without significant increases in evaluation staff and improvements in information technology. No excess capacity exists to tackle the increased workload.

The increase in bridges would also force an increase in HBRRP funding requirements but, since these would be relatively small and inexpensive structures, the increase in inspection and evaluation staff workload would be sharper than the increase in HBRRP funding needs.

2. FHWA regulations indicate that underwater inspections must be conducted every 5 years. The FHWA has received comments that it may be more economical to increase the time between inspections, while not impacting safety. Therefore, the FHWA is considering changing the 5 year underwater inspection intervals and developing intervals which are tied to pile or foundation materials as well as the environment where the bridge is located. What impact will changing the underwater inspection intervals have on public authorities complying with this as an NBIS requirement?

Ans. TDOT guidelines mandate an underwater diver inspection on all bridges that are over streams with water deeper than 3½ feet. All bridges, with water shallower than this limit, are inspected by the regular TDOT inspection teams during the routine 2-year inspections. Consultants perform the diver inspections. Tennessee currently has 17,009 bridges that are over waterways. Of these bridges, 527 are over water deep enough to require a diver inspection.

Since this is a relative small number of bridges, TDOT should be able to handle revisions in the inspection interval. Clearly, the current 5-year interval is another one of those “arbitrary” limits set by the FHWA. If data is available to link the risk of a foundation failure to specific types of foundation design and materials, then I see no reason why differing intervals could not be applied. It would require a modest effort to evaluate the existing set of deep-water bridges as to foundation design and then re-set their interval limits but this should not require an excessive amount of labor.

3. Scour, the leading cause of bridge failure in the United States, is not addressed directly in the current NBIS regulations, but is covered in a FHWA technical advisory. Should the FHWA consider providing guidance within the regulations to address this? Should the FHWA provide guidance for what public authorities should do after major storms? What, if any, would be the impact on public authorities complying with evaluation of scour at bridges criteria within the NBIS regulation?

Ans. Dealing with scour is a difficult and demanding problem. I am not sure that the NBIS regulations are the place to deal with such a technical problem. The current FHWA technical advisory approach is probably best. TDOT has already expended considerable effort and resources to identify which Tennessee bridges are prone to scour damage.

Providing guidance for what public authorities should do after major storms sounds reasonable until one considers that there is little that can be done beyond visiting the bridge site and making sure the structure is still standing with no visible signs of distress. The high floodwater usually makes it impractical to try to probe the bridge foundations for scour damage.

A number of scour detection devices have been developed to detect scour even during high water events. Perhaps funding guidelines should be altered so that scour detection device installation is identified as an acceptable expense for HBRRP funding.

4. FHWA regulations require that bridges be inspected every 2 years. The maximum interval can be increased to 4 years with FHWA approval after meeting certain conditions. Should the 4-year interval be increased so that more bridges would be eligible for the extended inspection cycle? What would be a reasonable interval? What impact would this have on the safety of bridges?

Ans. In general, the current 2-year inspection interval is acceptable. I see no need for intervals greater than the maximum 4-year cycle currently allowed.

I do have one suggestion. To qualify a bridge for the 4-year interval, the State must "submit a detailed proposal and supporting data to the Federal Highway Administrator for approval." This proposal must show that "past inspection reports and favorable experience and analysis justifies the increased interval of inspection".

It is a rather difficult thing to "prove" that a certain class of bridge is safe for a longer inspection interval. I am sure that the paperwork involved discourages the effort. However, there is one class of structure that I know has a low risk. This would be concrete box culverts. I would propose that (A) if a structure is a concrete box culvert, and (B) if the culvert is not structurally deficient and (C) if the structure is adequate for legal loads (i.e. not weight posted), then it should be automatically qualified for a 4-year inspection interval without further "proof" being required. I would like to see this exception codified within the NBI standards.

Tennessee has 7,853 box culverts that meet the conditions listed above. This represents 40.2% of our total bridge inventory. Moving to a 4-year inspection interval for these structures would generate considerable time and cost savings in terms of inspection and evaluation effort. Certainly the inspection of these structures on a 2-year cycle is unnecessary and a waste of time and resources.

5. The NBI Standards mandate detailed requirements for inspection team leaders and for the individual in overall charge of the inspection program. Should a Professional Engineer (PE) in overall charge of the program be required to have the same training as bridge inspectors and have additional experience in bridge inspection? Should the FHWA require that a licensed PE perform bridge inspections? Should the NBIS regulation be specific as to the discipline of the PE? Should the FHWA require certification training in proportion to the complexity of the bridge structure being inspected? Should those performing underwater inspections be required to be licensed PE's?



Ans. I am comfortable with the regulations as they currently stand. I do not feel that the ideas proposed above are really needed. A professional engineer is perfectly qualified to manage a bridge inspection program without further qualification or training required. Nor is there any need to specify a particular discipline for the PE. The rules in Tennessee (0120-4-.10 Profession Conduct) already specify that “The registrant shall perform his services only in areas of his competence”.

As for underwater inspections, TDOT already requires that a licensed profession engineer perform underwater diver inspections.

6. Bridge inspectors have indicated that those in management have made changes to their reports without having been in the field to view, first hand, the conditions of a particular bridge. The FHWA believes that any change to an inspection report should be made by the inspector who was out in the field. What, if any, would be the impact on public authorities complying with the condition of only allowing the inspector who was out in the field to change the inspection report as an NBIS requirement?

Ans. This is a leading question and, furthermore, the matter is not as “black and white” as the question indicates. While the inspector has indeed viewed the bridge, first hand, this does not mean that he has perfect knowledge of the situation. It is likely that individuals in management positions have access to information, such as load rating calculations, hydraulic calculations, calculated levels of scour, deck contamination test information, etc. which is not readily available to the inspector in the field.

The “inspector knows best” concept enunciated in the above question is only partly accurate. In my view, mandating that only the inspector can have input into the bridge inspection process is a poor idea which will either handcuff management’s ability to contribute valuable information or else force management to waste time and effort to confirm each change with a distant field inspector.

We try for a balanced approach here at TDOT. The bridge inspector generally sets the coding for bridge condition items but management is free to have input to other NBI items. If a significant change (i.e. a difference of 2 or more in coding the bridge condition items) is contemplated, we seek the concurrence of the bridge inspector. A change of plus or minus 1, however, is permitted without consultation.

The real solution to this problem is to employ improved information technology. Document management solutions exist which allow multiple versions of electronic documents to exist. Such a solution would allow the inspector to submit an original inspection report and also allow bridge evaluators or bridge managers to annotate the report with additional data.

The software would keep all these versions available for viewing. Most types of document management software also include security features that can control and limit revisions to the documents and also control access to the information.

In my opinion, the FHWA should specifically indicate that funding for improved bridge inspection report management technology is eligible for funding under the HBRRP. I would go even further and state that the FHWA should require the implementation of such technology for the bridge inspection report process. Such technology would save millions in bridge inspection costs over time and improve bridge safety across the board by improving timely access to bridge data. However, due to inertia and comfort with the current obsolete paper-based system, State governments and other public agencies will be slow to adopt such improved report management technology on their own. Leadership from the FHWA is vitally important in this area.

7. The current NBI Standards mandate reporting requirements of 90 days for bridges under State jurisdiction and 180 days for all other bridges. Should these reporting requirements be modified?

Ans. I agree with the FHWA, on this point, and think that the current reporting requirements are acceptable. I do not feel that any modifications are necessary.

This concludes my review of the issues raised by the notice of proposed rulemaking for the HBRRP and NBIS programs. If you have any questions or need further information, please advise.

Sincerely Yours,



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Manager, Bridge Inspection Office  
Tennessee Department of Transportation

CC: Mr. Tom Everett  
Mr. Paul Sharp